

ALLELOPATHIC POTENTIAL OF BIENNIAL WORMWOOD. Mark G. Ciernia and George O. Kegode, Research Specialist and Asst. Professor, Dept Plant Sciences, North Dakota State Univ., Fargo, ND 58105.

Biennial wormwood (*Artemisia biennis* Willd.) is native to northwest U.S. and western Canada and has become a problematic weed in several crops. In cultivated fields, biennial wormwood forms huge patches which adversely affect surrounding vegetation and crop production. A greenhouse study was conducted to explore the allelopathic potential of biennial wormwood plant parts. Biennial wormwood plants of different sizes were partitioned into leaves, roots, and stems, then dried and mixed into soil. Crop species, corn, soybean, sunflower, and wheat, and weed species, green foxtail, hairy nightshade, redroot pigweed, and wild oat, were seeded into amended soil and plant height and fresh weight was assessed at 14 days for crops and 21 days for weeds. Wheat was the most sensitive crop. Soil amended with biennial wormwood root biomass produced a 21% reduction in plant height and a 57% reduction in fresh weight of wheat compared to unamended soil. Hairy nightshade was the most sensitive weed species. Soil amended with biennial wormwood root biomass reduced plant height by 60% and fresh weight by 80% compared to unamended soil. Plant parts from biennial wormwood plants that were 45 cm tall at harvest were the most phytotoxic to both crop and weed species. Soil amended with biennial wormwood leaf and stem biomass from 15-cm-tall plants produced increased hairy nightshade plant height and fresh weight compared to unamended soil. In contrast, soil amended with leaf or stem biomass from 45-cm-tall plants produced hairy nightshade plants 40 and 67% shorter and with 67 and 82% less fresh weight compared to unamended soil. Soil that was amended with 45-cm-tall biennial wormwood plants was more phytotoxic to hairy nightshade than to other weeds. Hairy nightshade plant height and fresh weight was reduced by 79 and 93%, respectively in amended soil compared to unamended. Based on this study biennial wormwood appears to produce allelochemicals that are phytotoxic to some weeds and crops. Isolation, characterization, and detailed determination of phytotoxic allelochemicals is needed to understand factors contributing to biennial wormwood spread.